DOD Series

ALL-WEATHER MONITOR SERIES II

USER MANUAL

SIZES 8.4" - 10.4" - 12.1" - 15.0" RUGGED LCD DISPLAYS

DOD Series

Table of Contents

WELCOME!

With this purchase of this All-Weather Monitor DOD Series, we welcome you to iTechLCD's family of harsh-duty mobile computer products.

You will soon become familiar with the quality difference in this bright sunlight-readable (5 to 800 nits) Display, specifcally designed for mobile computing. ITECH has incorporated the latest optical engineering to achieve optimal viewability in all lighting conditions.

The DOD handles a wide-range of severe environments, making it the frst selection of many industries for their mobile applications. Designed to be rugged, this 800 x 600 SVGA Flat Panel Display is engineered to thrive in its environment... wherever it will be put it to work.

Housed in a milled billet aluminum case, the slim-profle DOD is light weight and watertight, with fully sealed IP68 connectors. Engineered to operate on low power consumption, the DOD manages a computer video input signal (VGA).

You may have purchased the DOD with the optional Analog Resistive Touch Screen; within this User Manual are instructions for confguring this feature. Other options include the Night Vision Filter (NVIS), a pass-through USB port and an internal heater, necessary when working in critically low temperatures, down to -40ºC (-40ºF).

Our Mobile Computing Support Team is here for you – we are iTechLCD, keeping *Technology in Motion.*

SAFETY

General Safety Instructions

- Before operating the DOD Display, read this User Manual thoroughly
- Keep this User Manual for future use
- Verify the computer system capability (see System Set-up) to insure operation of the Display
- For expeditious installation, follow these User Manual instructions in sequence
- Adhere to all Caution and Warnings on system and as stated in this User Manual
- User Manual instructions for installation and operation should be followed precisely
- Adjust only those controls covered by the User Manual's operating instructions; improper adjustment of other controls voids the Display's warranty and may result in Display damage, and
- Adhere to local installation codes.

General Safety Precautions
WARNING!

- *Power cable must be connected to a properly wired and grounded power source*
- *Any equipment to which the Display is attached must also be connected to properly wired and grounded power sources*
- *Do not connect or disconnect Display during an electrical storm*
- *Do not open Display enclosure – there are no user serviceable parts in Display*
- *Do not disassemble or modify Display to avoid possibility of electrical shock, damage to electrical components or scratching the Display surface, and*
- *Disassembly of Display voids warranty.*

Safety Icons

WARNING!

Warning! Shock Hazards
This icon is intended to tell the User of a potential risk of electrical shock.

CAUTION!

Caution! Instructional
This icon is intended to tell the User of important operating and/or maintenance instructions.

General Unit Safety

- Always disconnect Display from power source before cleaning
- Do not operate Display with a damaged cable, and
- Do not operate if Display has been dropped or damaged. Unit should be inspected by qualifed ITECH Service Personnel.

Fluids from LCD Display
CAUTION!

- If the Display should ever become shattered, do not touch fluids from the LCD Screen
- If fluid should get on hands or clothing, immediately wipe off with liquid soap or rubbing alcohol on a clean towel; wash with water; immediately consult with a doctor, and
- If fluid gets in the eyes, flush eyes immediately with water for a minimum of 15 minutes; immediately consult with a doctor.

Electrical

Connecting Cables

- Disconnect power to computer when Display is being installed
- Upon installation, verify power input connector is securely seated on Display
- Position power cable so it is not in contact with hot surfaces
- Do not allow anything to rest on power cable, and
- Protect power cable from extreme heat sources.

Power Source

- Always connect to a properly grounded DC (standard) power source
- Any equipment to which Display is attached must also be connected to properly wired and grounded power sources
- Input voltage is 10 - 36 VDC, and
- Power Consumption is: 6 - 20 Watts maximum for DOD8400R, 1000R and 1200R and 6 40 Watts for DOD1500R.

⚡ **WARNING!**   **Power Consumption**

DOD8400R, 1000R, 1200R are listed at 6 - 20 Watts maximum.
DOD1500R is listed at 5 - 40 Watts maximum.

Servicing

User

- User Servicing is limited to cleaning the Display
- Do not disassemble or modify the Display to avoid the possibility of electrical shock, damage to its electrical components or scratching the Display surface, and
- Disassembly voids the warranty.

ITECH

ITECH Qualifed Service Personnel may be required to service the Display if:
- Does not operate normally when installation instructions are followed
- Does not operate normally when operating instructions are followed
- Has been dropped or damaged, or
- Exhibits a distinct change in performance, indicating a need for service.

Shipping to ITECH Service Center

If Display should need to be shipped to the ITECH Service Center, the original packing material should be used to insure safety of Display in shipping. Repack Display as it originally received.

PRODUCT CARE AND MAINTENANCE

Product Care

This DOD Display has been designed to provide optimum performance and service without any required scheduled maintenance other than occasional cleaning.

> **WARNING!** *Warning! Disconnect Display from power source before cleaning optional Touch Screen or Display's enclosure.*
>
> **CAUTION!**
> - *Do not use abrasive cleaners or solvent-based (flammable) cleaners on the Flat Panel or Touch Screen Display, its enclosure or any other electrical device (cables, power cable, etc.)*
> - *Do not use paper products as they may scratch the Display screen, and*
> - *Do not directly apply cleaning solutions to the Display screen.*

Display Screen Cleaning
The Display Screen is a glass-based product.
- **A vinegar-based cleaner is preferred; prevents streaking and degradation of coatings, or a non-abrasive glass cleaner such as a professional foam glass cleaner**
- **Apply cleaning solution to a soft clean cloth, dampening slightly**
- **Keep a fresh side of cleaning cloth towards Display screen surface to avoid scratching with accumulated grit, and**
- **To minimize risk of abrasion to Display screen, air drying is recommended.**

> **USER TIP**
> *In marine or similar environments, an added benefit of a vinegar-based cleaner is its effectiveness in dissolving mineral and salt deposits.*

Optional Touch Screen

> **WARNING!** *Warning! Touch Screen Display may be activated when cleaning. This may create a potentially dangerous condition: power down; disconnect cabling prior to cleaning. To disable: go to Tools tab > Select Screen Cleaning button > Touch Screen is disabled for 15 seconds to allow cleaning > Display reverts to default Touch after 15 seconds.*

Touch Screen Cleaning
The Touch Screen Display is a glass-based product.
- **Use a special screen cleaning tissue or a solution specifcally formulated for antistatic coatings. Follow the manufacturer's instructions, or**
- **Lightly dampen a soft clean cloth with water or a general purpose mild detergent solution**
- **Keep a fresh side of the cleaning cloth towards the screen surface to avoid scratching it with accumulated grit, and**
- **To minimize the risk of abrasion to the screen, air drying is recommended.**

Display Enclosure
- **Clean the Display enclosure with a soft clean cloth lightly dampened with a general purpose mild detergent solution**
- **Wipe down with clean water, and**
- **Dry with a soft clean cloth.**

Long-term Storage

- For long-term storage, Display should be stored in a normal indoor environment and Display screen be protected from accidental damage
- For pedestal mount Displays, disconnect cable(s) and loosen arm adjustment to a point where ball can be removed from arm, or
- For Flush or Panel Mount Displays, cover Display with a protective covering that will not scratch or transfer dyes to Display screen.

Maintenance

> **⚠ WARNING!** **Power Cable**
>
> *To avoid shock and fire hazards, replace the Display's power cable if:*
> - *Insulation becomes damaged, or*
> - *A loose connection is suspected.*

Other Maintenance

Only ITECH Qualifed Service Personnel should perform all other maintenance except for

cleaning and the power cable replacement described above.

> **⚠ WARNING!** *Warning! To avoid risk of electrical shock, do not disassemble the Display's enclosure. Users cannot service the Display. User maintenance is restricted to cleaning or power cable replacement as explained. Disassembling the Display voids the warranty.*

SYSTEM SET-UP

System Requirements

The computer the DOD is connected to must have this capability:
- Video card setting with a minimum resolution of 640 x 480 pixels, and
- If the optional Touch Screen Display is ordered, an available COM or USB port for the connector is required, depending on the Display connector style ordered.

Shipping Box Contents

The DOD is shipped in a custom box with custom foam packaging. The installer should save the box and all packaging materials in case the Display would need to be returned to the ITECH Service Center.

The Shipping Box contents are:
- DOD Display
- Power Cable
- RGB (Computer) Input Cable
- Mounting System and Hardware
- Touch Screen Cable if optional Touch Screen Display is ordered
- USB Cable if optional USB Pass-through is ordered

INSTALLATION

The DOD is designed to be mounted in three confgurations: with a universal ball-and-socket mounting kit, in a Flat Panel or optional Flush Mount confguration.

Pedestal Mount

The DOD is shipped with a RAM® universal ball-and-socket system mounting kit (Figure 2). By installing the Display with this kit, the User can adjust the viewing angle to improve viewability in changing environments. This ball-and-socket system has proven to be successful in supporting an extreme amount of weight in high vibration and diffcult-mount applications. Visit **www.itechlcd.com/installation** for product mounting diagrams.

Locate the ball-and-socket system in the shipping box. The kit consists of two RAM balls on mounting plates and a RAM arm with an adjustable T-knob and a packet of three (3) M4 x 10 counter-sunk stainless screws for mounting to the DOD. (Figures 2 - 4)

Figure 2

Panel Mount Only

Ball and Socket Mount Only
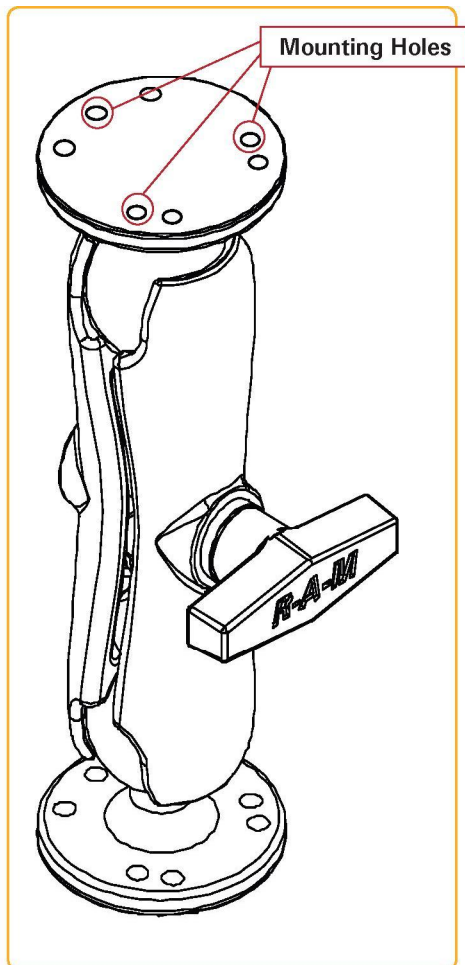
Figure 3

Mounting Holes

Figure 4

There are three mounting holes in the back of the Display for the attachment of a ball mounting plate. Take care not to strip the screw holes or over tighten. (Figure 4)

It is recommended the remaining ball be mounted on a fat surface. Because of the various surface substrates where the Display is to be mounted, the installer provides the screws to mount the other ball.

- Note the location of the three mounting holes on a ball mounting plate (Figure 4)
- With three (3) M4 x 10 counter-sunk stainless screws (Figure 3) attach mounting plate to the back of the DOD (Figure 2)
- Mount the second ball mounting plate on the surface where the Display is to be installed
- Insert each ball into the RAM arm
- Lightly tighten the arm around the balls using the T-knob on the arm (Figure 2, 4)
- Adjust the Display to the viewing preference, and
- Tighten the T-knob to hold the Display in position.

Panel Mount

Panel Mount installation should be specifed at time of order; the ball-and-socket mount system will not be included in shipping box. (Figure 5)

For installation, there are four tapped mounting holes on four corners of the Display's rear panel. A mounting hardware packet is included with product accessories in the shipping box. This packet includes four (4) M4 stainless steel threaded studs, 7.6 cm (3" long), four (4) Nylock self-locking nuts and four (4) fat washers.

Figure 5

It is recommended installer refers to the mount drawings on ITECH's web site, (www.itechlcd.com/installation), for exact measurements of Display's rear panel pod. These drawings should be helpful when installer cuts the required opening for the Panel Mount installation.

> ⚠ **CAUTION!**   *Take care not to strip screw holes or over tighten as the enclosure is aluminum.*

Flush Mount with Optional Bezel

With the Flush Mount Bezel, the DOD Flat Panel Display may be mounted fush with mounting surface; ball-and-socket mount system or any mounting hardware will not be included in the shipping box. Installer needs to supply screws for this installation.

The mount diagram of the Flush Mount Bezel is on ITECH's web site, (www.itechlcd.com/installation). When placement site has been decided, it is recommended installer use these measurements when cutting opening for Display's installation.

Note Locations of milled holes in Flush Mount Bezel. Drill corresponding holes into the substrate where Display is to be mounted.

DISPLAY CONNECTIONS

Cables

- **The DOD is packaged with two cables: RGB (Computer) Input and DC Power, #1 and 2 in Figure 5**
- **The AC Power Adapter is optional. (Figure 6)**

1 RGB (Computer) Input
2 DC Power Input

⚠️ **CAUTION!** *Use care when inserting or removing connectors.*

Connectors

Connectors are located on the bottom of the Display housing, from left to right: Optional USB Pass-through, Optional Touch (Screen) and Power and Computer Input, (Figure 7).

Connectors are physically unique to insure the installer makes the proper connections.

1 Optional USB Input
2 Optional Touch Input
3 Power Input
4 Computer Input

Figure 7

Computer Input Connector

- **The IP68 sealed Computer Input Cable, 3 m (10 ft), is in the shipping box**
- **Line up the red dots on the connectors**
- **Push the cable connector into Display's Computer connector, #4 in Figure 7, and**
- **Plug the standard DB-15 (video) female connector to the computer's video source; secure.**

DC Power Connector

- **The IP68 sealed DC Power Cable, 3 m (10 ft), is in the shipping box**
- **Line up red dots to Power Input connector, #3 in Figure 7**
- **Plug in the quick-connect 3-pin connector**
- **To disconnect, pull outside ring on connector away from Display until cable is free**
- **Positive fying lead is marked with "+" label**
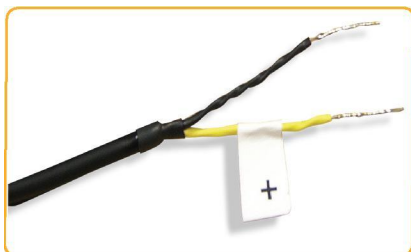- **Negative lead is not marked (Figure 8)**

Figure 8

Connect fying leads to corresponding polarity on DC voltage source, primary terminal.

⚠️ **WARNING!**

Power Consumption

DOD8400R, 1000R, 1200R are listed at 6 - 20 Watts maximum.
DOD1500R is listed at 5 - 40 Watts maximum.

OPTIONAL CONNECTORS

Optional USB Pass-through Connector

- **The optional USB Pass-through Connector is an IP68 sealed 4-pin connector**
- **The custom USB Cable is with the product accessories; it is .6 m (2 ft)**
- **Line up the red dots to USB connector, #1 in Figure 7, and**
- **Plug together.**
- **To disconnect, pull the outside ring on the connector away from Display until free.**

Optional Touch Screen Connector

- **The optional Touch Screen Connector is an IP68 sealed 5-pin connector**
- **The connector is next to the Power Connector**
- **The Touch Screen Cable is in the shipping box; it is 3 m (10 ft)**
- **Line up the red dots to Touch Connector, #2 in Figure 7, and**
- **Plug together.**

OPTIONAL AC POWER ADAPTER

Optional AC Power Adapter

- **The optional AC Power Adapter Cable Set consists of a 3 m (10 ft) cable with an IP68 sealed connector, the power adapter and a 1.8 m (6 ft) common AC power cord (Figure 6)**
- **The adapter accepts voltage from 110 to 250 VAC and frequency from 47 to 63Hz**
- **The AC power cord plug is a North American standard for 120 VAC/60Hz**
- **Line up the red dots to Power Input connector, #3 in Figure 7, and**
- **To disconnect, pull the outside ring on the connector away from Display until free.**

Note: The optional AC Power Adapter is not an off-the-shelf item. It is equipped with a specifc connector for integration with the DOD Display.

COMPUTER HOOK-UP

Computer Display Properties - SVGA or XGA

Prior to connecting the DOD to the computer, connect the computer to a CRT monitor to verify the computer video display properties are set to 800 x 600 (SVGA) pixels or if ordered, the optional 1024 x 768 (XGA) pixels. The 15" video Display is to be set to 1024 x 768 pixels (XGA).

Setting the Display Settings

1. **Connect computer to a CRT monitor to establish the computer's display properties**

2. **Right mouse click on an open area of the desktop screen to bring up the Desktop Menu**

3. **Left mouse click on Properties to open the Display Properties menu (Figure 9)**

4. **Select the Settings tab**

5. **Under Screen Resolution, verify or slide the bar until the Screen Resolution is at 800 x 600 pixels (SVGA) or optional 1024 x 768 pixels (XGA) (Figure 10)**

6. **Select the Advanced button; go to the next menu to verify the Hz refresh rate**

7. **Select the Monitor tab**

8. **Under Monitor Settings, verify the Screen Refresh Rate is between 60 and 75Hz**

   - **If so, select the Cancel button; go to Step 9**

   - **If not, select a setting within the 60 – 75Hz range, and**
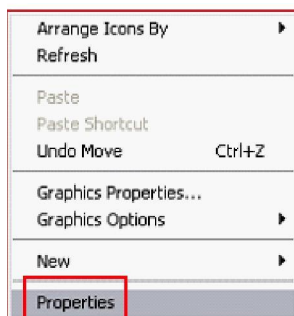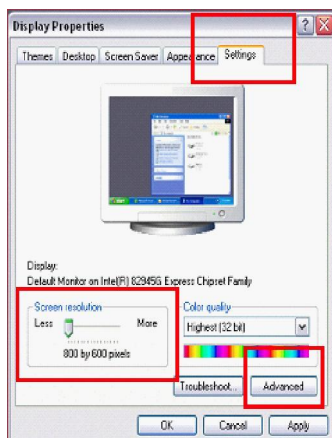
   - **Select the Apply button**

Figure 9

Figure 10

9. At the Monitor Settings dialog box, select "Yes" to accept the new desktop view settings (Figure 11)

10. In the Display Properties dialog box, verify the Screen Resolu-tion is at 800 x 600 pixels (SVGA) or optional 1024 x 768 (XGA)

11. Select the Apply button

12. At the desktop screen, shutdown the computer

13. Turn off the monitor, and

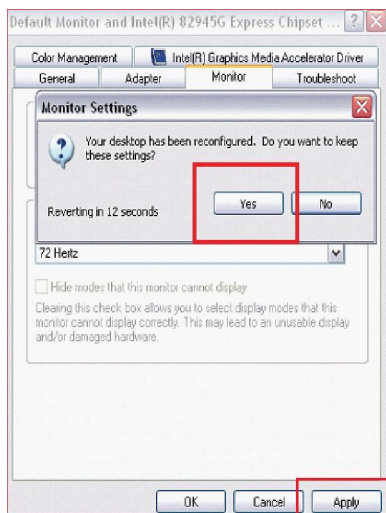14. Disconnect the monitor from the computer.

Figure 11

Power on the Display
- Connect the DOD to the computer
- Power up the DOD, and
- Power up the computer.
- The Windows Operating System should automatically apply the best generic driver for this connection.

USER TIP

Signal Quality
- The cable supplied with the Display provides the optimum image if proper wiring practices are followed
- Install the cable properly and keep it away from sources of EMI such as electric motors, or unshielded RF sources such as radar and microwaves
- The strength of the video signal provided to the AWMR Display has a direct bearing on the quality of the images displayed
- Splitting the video signal also splits the strength of the signal
- If installation requires more than one Display to be driven from a single video source, it is highly recommended that a video signal booster (line driver) be used in the circuit, and
- Some splitters are available with an integral line driver. Whether or not a line driver is used, single cable lengths in excess of our standard cable length should be of high quality shielded Computer Input cable.

OPERATOR CONTROLS

On the right hand side of the Display bezel are seven Operator Control buttons (Figure 12)

POWER ON/OFF Button

Note: Display defaults to an AUTO-OFF state when power
is applied.

- **The POWER ON/OFF button is marked with the I/O (Input/Output) symbol**
- **Momentarily pressing this button turns ON or OFF the Display, and**
- **Blue LEDs glow behind the buttons when the Display is powered on.**

Power On/Off (I/O)
Button

Brightness Control Toggle
(Large Sun, Small Sun)

Select Button

Up Button

Down Button

Source Select Button

Figure 12

Brightness Button
The toggle button is second; it controls the brightness of the Display.

- **LARGE SUN button: when repeatedly pressed or held down will cause the Display's backlight brightness to step up in increments to its brightest setting**
- **SMALL SUN button: when repeatedly pressed or held down will cause the Display's backlight brightness to step down in increments to its lowest setting,**
- **Lowest Setting: is almost total black, suitable in very subdued light, as in night time operations, and**
- **Adjusted settings are maintained during power cycles.**

USER TIP

Adjust brightness of Display to lowest possible setting for a given set of conditions and display characteristics. Doing so will:
- *Provide best viewing of image*
- *Extend lamp life of backlight*
- *Reduce internal heat of Display, and*
- *Consumes less power.*
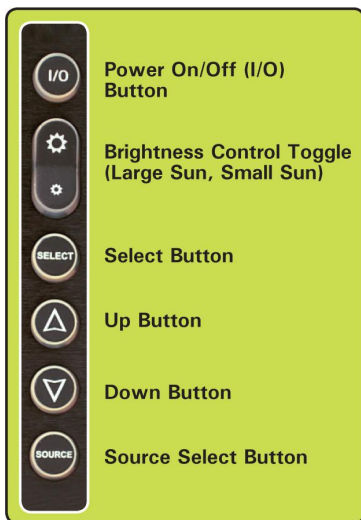
Select Button
The SELECT Button is used to start the OSD Menu. This button is also used to select a function within the Menu. (See On-Screen Display.)

Up Arrow Button
The UP Arrow Button is an adjustment tool in the OSD Menu. (See OSD Menu Categories.)

Down Arrow Button
The DOWN Arrow Button is an adjustment tool in the OSD Menu. (See OSD Menu Categories.)

Source Button
DOD handles one video source; SOURCE Button would be used to move between video inputs without opening the OSD Menu. (See On-Screen Display section.)

ON-SCREEN DISPLAY

The On-Screen Display (OSD) User Interface is where display adjustments are made. With its user-friendly graphical interface, the OSD Menu provides access to fne-tuning the Display according to the User's preferences.

OSD Menu Activation

To activate the OSD menu, press and release SELECT Button.

Note: OSD Menu closes after 30 seconds of inactivity. This setting may be adjusted in the OSD Menu: Tools: OSD Timeout.

OSD Menu Categories

The OSD Menu is comprised of fve icons and an Exit Button; each icon represents a distinct menu category with its corresponding functions. (Figure 8)

Note: OSD Menu selections are indicated by icon only; there is no text.

| INPUT SELECTION | IMAGE ENHANCEMENT | COLOR | IMAGE SETTINGS | TOOLS | EXIT |

Figure 8

General Operating Instructions

- To open the OSD Menu, press (once) the SELECT Button
- OSD Menu appears across bottom of Display screen;
- Use UP or DOWN Button to move across Menu; selected icon turns yellow (Figure 9)

| INPUT SELECTION | IMAGE ENHANCEMENT | COLOR | IMAGE SETTINGS | TOOLS | EXIT |

Figure 9

- As Main Menu icon is highlighted, its Submenu appears in OSD dialog box
- Press (once) SELECT Button to enter selected Main Menu icon Submenu screen
- A highlight bar is superimposed over the frst menu item
- Press UP or DOWN Button to move the highlight bar through the Submenu
- Press (once) SELECT Button to activate the highlighted Submenu item
- To Change values: press UP or DOWN Buttons, which increases (UP) or decreases (DOWN) the value of the parameter as indicated in OSD dialog box; hold Button down to fast forward

- **Press (once) SELECT Button to go to a new menu item (Figure 10), or**
- **Press (once) SELECT Button to save new value or wait for OSD to timeout; it will auto-close, saving all changes**
- **To choose another menu item, use UP or DOWN Button to move across Main Menu; repeat instructions, and**
- **To Exit, use UP or DOWN Button to move across OSD Menu to highlight Exit Sign icon; press (once) SELECT Button to Exit; upon Exit, all changes are saved.**
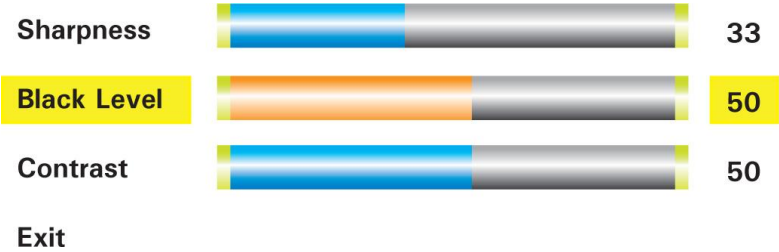
Sharpness		33
Black Level		50
Contrast		50
Exit		

Figure 10

⚠ **CAUTION!** EXIT

Saving Changes
- *The Exit Button saves adjustments made to the OSD then exits the Menu, or*
- *If the OSD times out, any adjustments made will automatically be saved, then the Menu closes.*

OSD Menu Categories

Input Selection

The Input Selection Menu enables a selection of three Composite video input signals. Selection is based on Display confguration and its dependency upon a specifc signal source. Main power recycle resets input source to default, C Video 1 (Composite).

Note: The SOURCE Button on the Display allows for moving through various video input signals without accessing the OSD Menu.

C Video 1

Select for frst Input Signal. Select Exit Button to save.

C Video 2

Select for second Input Signal. Select Exit Button to save.

C Video 3

Select for third Input Signal. Select Exit Button to save.

EXIT **Exit**

Select Exit Button to save changes and exit from OSD Menu.

Image Enhancement

The Image Enhancement Menu enables adjustments of Image Enhancement values.
Sharpness

Select Sharpness to adjust Sharpness of displayed image. Use UP (right) or DOWN (left) Button to adjust in preset increments. Select Exit to save.

Composite input signal factory default is 33 within a range of 0 - 100.

Black Level

Select Black Level to adjust Black Level of input Composite Signal. Factory default is 50 within a range of 0-100. Use UP (increase) or DOWN (decrease) Button to adjust in individual increments. Select Exit Button to save.

Contrast

Select Contrast to adjust difference in brightness between light and dark areas of Display pixels. Factory default is 50 within a range of 0 - 100. Use UP (increase) or DOWN (decrease) Button to adjust in individual increments. Select Exit Button to save.

Exit

Select Exit Button to save changes and exit from OSD Menu.

Color

The Color Menu enables adjustments of Color Parameters of the Display image.

Composite Input Signal

Hue

Select Hue to adjust shading (gradation) within colors. Factory default is 50 within range of 0 - 100. Use UP (increase) or DOWN (decrease) Button to adjust in individual increments. Select Exit Button to save.

Saturation

Select Saturation to adjust intensity or vividness (saturation) of color. Factory default is 50 within range of 0 - 100. Use the UP (increase) or DOWN (decrease) Button to adjust in individual increments. Select Exit Button to save.

Color Reset

Select Color Reset to reset active Composite signal Color parameters Hue and Saturation to factory default values (50). Select Exit Button to save.

Note: Color parameters will reset active Composite Video Input Signal only.

Exit

Select Exit Button to save changes and exit from OSD Menu.

Image Settings

The Image Setting Menu enables Display screen adjustments if Display is set-up for a VGA Input Signal.

Note: Composite: Icon will be grayed, as it is unavailable.

Tools

The Tool Menu enables adjustment of miscellaneous parameters.

OSD Timeout

Factory default OSD Timeout setting is 30 seconds. Interval selections are Off, 5, 15, 30 and 60 seconds. Select to adjust time elapse between last Menu activity and when Menu exits. Use the UP (increase) or DOWN (decrease) Buttons to change the values. Select Exit Button to save.

Note: Any changes made in will be saved upon Timeout Exit.

NVIS Green / NVIS Red

If unit is equipped with NVIS Green / NVIS Red option, User has to set the NVIS mode to be active at power-on; Display will default to that NVIS color theme.

Use the UP ARROW Button to select NVIS Red.

Use the DOWN ARROW Button to select NVIS Green.

Picture-in-Picture (PIP) Menu *(Not Available with "R" Series; No Video Feed)*

The User may view a second video source in addition to the default signal source by utilizing the Picture-in-Picture (PIP) feature.

The PIP Menu has two selections: PIP Source; PIP Mode.

PIP Source

PIP Source allows User to select the Composite Video Source (C 1 - 3) for the PIP.

PIP Mode

PIP Mode allows User to select Display Video Source viewing modes of OFF or PIP.

- OFF: turns off the PIP setting
- PIP: turns on the PIP view
- Settings are maintained during power cycles (ON/OFF Button), and
- Settings return to factory default at main power recycle.

Factory Reset

> ⚠️ **CAUTION!**
>
> **Factory Reset**
> **Factory Reset will reset all OSD changes made to Video set-ups with the exception of the PIP settings.**

Select Factory Reset to reset Display screen adjustments Color Settings *(Sharpness, Black Level, Contrast)* and Color *(Hue, Saturation)* to factory default values (50). Select Exit Button to save.

EXIT **Exit**

Select Exit Button to save changes and exit from the OSD Menu.

OPTIONAL INTERNAL HEATER

Optional Internal Heater
The optional Internal Heater automatically brings the Display up to the standard operating temperature if the Display is below that temperature when powered on.

Operations
- The fashing blue LED lights behind the Operator Control Buttons indicate Display is in the heating mode, bringing the Display up to operational temperature
- Once the Display is up to operational temperature, the fashing blue LEDs become a constant blue glow and the Display automatically powers on
- Maximum time for the Display to reach operational temperature is approximately 12 minutes, and
- There are no User adjustments for the Internal Heater function.

NVIS OPTIONS

NVIS Filter

ITECH's integrated NVIS options produce near zero to minimal color shift full sunlight readability displays. The integrated NVIS complies with NVIS radiance value requirements of MIL-STD-3009 and MIL-L-85762A for Type 1, Class B, electro-optical displays and can be viewed with NVGs (Night Vision Goggles) through the entire brightness range.

Dimming is not necessary to meet MIL-STD-3009, Class B NVIS requirements.

Note: Display brightness levels will be reduced with the NVIS option.

NVIS Green / Red (OSD)

NVIS Green / Red OSD option allows interfacing with Night Vision devices without adverse effects. The Display will automatically power on in NVIS mode. Daylight mode can be displayed by pushing the UP ARROW Button. This button allows User to toggle between Day Mode and NVIS Mode.

User selects either NVIS Green or NVIS Red in the OSD menu. Once saved in the OSD, the UP / DOWN ARROW Buttons will toggle between that selection (Green or Red) and Day Mode; both NVIS colors are not available at the same time.

OPTIONAL USB PASS-THROUGH CONNECTOR

Note: The USB Pass-through Connector on the other end is standard A-type USB port socket and is not sealed.

Optional USB Pass-Through Connector

The optional USB Pass-through Connector signal is sent through the Touch Screen (T/S) cable connection to the computer.

• Install T/S 5-pin connector to the Display's rear pod, #2, Figure 7
• Install T/S cable's USB connector to any computer USB port, and
• Install 4-pin, .6m (2 ft) USB Pass-through Cable to Display's rear pod, #1, Figure 7

Optional USB Pass-Through Connector with Touch Screen Display

The optional USB Pass-through Connector signal is sent through the Touch Screen (T/S) cable connection to the computer.

• Install T/S 5-pin connector to Display's rear pod, #2, Figure 7
• With split end of T/S Cable, install the USB connector to any computer USB port
• Install the other end, the Touch Screen Display RS-232 Connector, to a computer serial port, or
• Install the other end, the Touch Screen Display USB Connector, to a computer USB port
• Install the IP68 sealed 4-pin, .6m (2 ft) USB Pass-through Cable to Display's rear pod, #1, Figure 7.

OPTIONAL TOUCH SCREEN DISPLAY

Operating Systems

Operating Systems compatible with TSHARC Touch Screen Controller Driver are: Windows 98se, 2000, ME and XP. It is not compatible with Microsoft Vistas.

> ⚠️ **CAUTION!** *TSHARC Touch Screen Controller Driver is not compatible with Microsoft Vistas Operating System.*

DOD Optional Touch Screen Installation

> ⚠️ **CAUTION!** *If installing a new operating system (O/S), do not install Touch Screen Controller Driver until O/S is installed and computer's video display settings have been verified (see section Computer Display Settings). Touch Screen Controller Driver uses computer's O/S display driver settings to accurately configure T/S Controller Driver files.*

Previous Versions of Touch Screen Controller Drivers

> ⚠️ **CAUTION!** *Previous versions of ANY Touch Screen Controller Driver must be removed before installing the latest version of the TSHARC™ Touch Screen Controller Driver.*

Uninstall TSHARC™ Drivers Utility

Uninstall a Previous Version of the TSHARC Driver

The uninstall utility TSUN10.exe is available on ITECH's web site: **www.itechlcd.com**. Go to the Support tab > Drivers Touch Screen Driver > Uninstall Utility. This utility uninstalls TSHARC drivers only.

To download the utility, left double mouse click on the fle name.

At the File Download dialog box, select Save (Figure 13) > Save the fle to the computer's program fles > Make a new folder: TSHARC Uninstall > Select Open > Save the TSUN10.exe fle > At the dialog box: Download is complete, select Open Folder > Left double mouse click on TSUN10.exe to execute the utility > At the dialog box: Do you want to remove, select Yes > At the dialog box: Press OK to complete the uninstall, select OK > At the uninstall confrmation screen, select OK. Follow instructions.

Figure 13

> ⚠️ **CAUTION!** *The dialog box stating it is removing all Touch Screen Drivers from the computer means it is removing all TSHARC drivers. Other Touch Screen Drivers must be uninstalled with their manufacturer's uninstall utility.*

Previous Versions of Other Manufacturers' Touch Screen Drivers If a different T/S Controller Driver (not TSHARC) is on the computer, it must be completely removed before installing the TSHARC. Note: The typical driver uninstall program or Microsoft's® remove program utility does not remove all tracks of a T/S Driver installation. Contact the manufacturer of the previously installed driver program to learn how to completely uninstall their product. These instructions may be available from the manufacturer's web site.

Touch Screen Installation

TSHARC Touch Screen Controller Driver
The TSHARC T/S Controller Driver fles are available on ITECH's web site:
www.itechlcd.com. Go to the Support tab > Drivers Touch Screen Driver > Operating System.

> ⚠️ **CAUTION!** *Before loading the Touch Screen Controller driver, verify the COM ports are enabled (especially if connecting to a laptop computer).*

Installation
1. Verify the T/S Cable is connected to the Display or attach the T/S Cable's 5-pin connector to the Display's 5-pin connector #2, Figure 7
2. Attach the T/S Cable's RS-232 connector to the computer serial (COM) port where the T/S will be installed, or
3. If the T/S was ordered with a USB connector, insert the cable to the computer USB port where the T/S will be installed, and
4. If the optional USB Pass-through was ordered, attach the T/S Cable's other split end connector, the USB, to a computer USB port.

Note: For Multi-Display Touch Screen applications, all Monitors must be connected to the computer before installing the TSHARC driver.

> ⚠️ **CAUTION!**
> * *For Multi-Display DOD Touch Screen applications, all Monitors must be connected to the computer before installing the TSHARC driver*
> * *If installing RS-232 connectors, the drivers have to be installed for each T/S, or*
> * *If installing USB connectors, the drivers install once for multiple Touch Screens*
> * *If the T/S connector is USB, the Window O/S loads a temporary USB driver; wait for the driver to load.*

5. Boot up the computer; download the Driver zip fle to the Desktop
6. On Desktop, left double mouse click to open
7. Follow instructions to unzip the fle
8. Save fle where User chooses, and
9. Left mouse double click to run "set-up.exe"
10. Follow instructions.

USB Touch Screen: Basic Power ON/OFF Instructions

> ⚠️ **CAUTION!** *Note: When powering down Display, it is recommended to leave off for a minimum of 15 seconds so USB Touch Screen Drivers can clear. If not followed, there will be a delayed response (up to 18 seconds) as USB Drivers reload and then recalibrate.*

TSHARC Installation

EULA Agreement

Figure 14

1. **At Welcome screen, select Next to go to End User's (Software) License Agreement (EULA)**
2. **After reading EULA, if in agreement, check box "I accept all of the terms…" (Figure 14), and**
3. **Select Next**
4. **If not in agreement, follow instructions and Exit.**

Note: Any unlawful use of the TSHARC driver is a strict violation of United States and International copyright laws. Using a TSHARC driver with any third party Touch Screen is strictly prohibited.

Select Controller

Note: A PS/2 Controller Interface is not available.

1. **The TSHARC Driver is a 12-bit Controller; the radio button is selected by default**
2. **Select Controller Interface matching the cable used to install the DOD - serial or USB**
3. **Select Autodetect button if installing the T/S through a RS-232 (serial) Interface**
4. **There are two options for RS-232 installation: Autodetect and Manual. Manual instructions are found in section Manual RS-232 Controller Set-up (Figure 15)**
5. **If connecting through a USB Interface, select the USB radio button**
6. **Select Next**
7. **Following installation, select Finish, and**
8. **Reboot computer when prompted.**

Figure 15

> ⚠️ **CAUTION!** *Do not select Autodetect if manually setting up the Touch Screen COM port.*

Autodetect RS-232 Controller Set-up
1. **Select Autodetect button**
2. **The "AutoDetect Serial" dialog box lists the detected RS-232 Controller information. Select OK**
3. **"Installing Touch Screen Driver" text box pops up, indicating the progress of installation**
4. **Following installation, select Finish, and**
5. **Reboot computer when prompted.**

Manual RS-232 Controller Set-up

1. **Select Controller Interface RS-232 button (Figure 16), and**

2. **Select Next** *Note: Do not select*

Autodetect

3. **Enter COM port selection**

4. **The T/S Controller baud rate default is 9600**

Note: This is a Resistive T/S Display. The Capacitive Controller option is not available.

5. **Select Next**
6. **Following installation, select Finish, and**
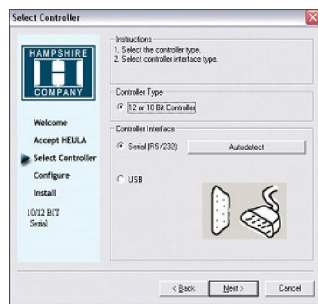7. **Reboot computer when prompted.**

Figure 16

Enable Touch Screen Tray Icon

1. **If User wants a T/S Controller tray icon (associated with Display Rotational Menu) in toolbar tray, select box (Figure 17), or if User will be installing Third-Party Display Rotation Drivers, enable the T/S Tray Icon, and**
2. **Select Finish button; TSHARC driver is installed.**

Figure 17

Disable Touch Screen Tray Icon

If User does not want a T/S Controller tray icon to show in the toolbar tray, select the Finish button; the TSHARC driver is installed.

Installation Complete

At dialog box, "Set-up is now complete", select OK, exiting TSHARC T/S Controller installation.

TSHARC Calibration Program

Upon reboot, the T/S is functional, but not calibrated. Calibration must be confgured for the T/S to work properly. The TSHARC Control Panel initiates the calibration process.

• **Go to Start > Programs > Hampshire TSHARC Control Panel. The Control Panel has several tabs. Each tab provides links to tools to modify the TSHARC Driver to meet specifc needs:**
   • **Screen Selection**
   • **Calibration**
   • **Edge Acceleration**
   • **Click Settings**
   • **Touch Settings**
   • **Capacitive Settings (disabled)**
   • **Tools**

Note: The DOD is a Resistive Touch Screen: the Capacitive Setting is disabled.

TSHARC Control Panel
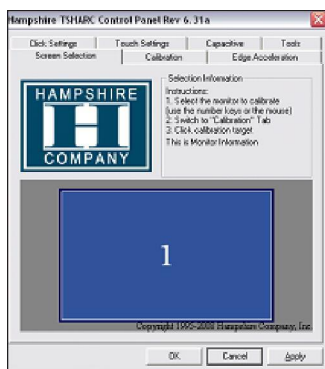
Screen Selection

Note: If this is not a Multi-Display installation, skip to section Calibration.

Confguring a Multi-Display Installation

Note: Microsoft does not support a Multi-Display installation in Windows 98se.

1. The Controller installation program opens to Screen Selection tab. Note graphic representation of Displays installed on the system (Figure 18)
2. Using keypad or the mouse, in shown numbered sequence select Display icon to calibrate
3. Switch to Calibration tab.
4. When calibrated, return to Screen Selection tab; in sequence select next Display. Repeat process until all Displays are calibrated.

Calibration General Instructions
Calibration aligns the T/S overlay to specifc points on the Display screen.

1. In ten seconds the Calibration program launches, or select Calibration tab (Figure 19)
2. Default Calibration process is Four-Point, the best known general calibration; it compensates for skew and some edge linearity anomalies,
3. To calibrate to Four-Point, select Begin Alignment button, and
4. Go to section Calibration Process

Figure 18
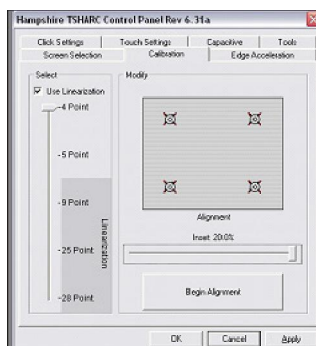
Figure 19

Custom Calibration Settings

1. To customize the Calibration process, select Calibration tab to bring up optional Calibration Points menu (Figure 20)
2. Above Alignment button is Inset Slide Bar which moves edge calibration points into the display screen area if User wants to calibrate the edges of the T/S more precisely. Default is 20%.
3. Linearization (equates to touch accuracy): Varied linearity exists between T/S types; On the left menu, click on number of Calibration points to confgure:
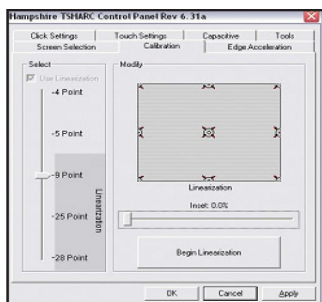

Figure 20

- **Four-Point:** A quick calibration of a known good T/S overlay with no correction applied.
- **Five-Point:** Compensates for skew and some edge linearity anomalies.
- **Nine-Point:** More accurate than Five-point calibration. No correction is applied.
- **Twenty-Five Point:** Provides a higher level of T/S linearization and skew correction.
- **Twenty-Eight Point:** Provides the highest level of T/S linearization.

Calibration Process
1. Select 'Begin Alignment' button
2. Press graphic Target to start calibration (Figure 21)
3. Targets are used to calibrate the Touch Screen. Follow the on-screen instructions - 'Touch' the target center, 'Hold' until it shrinks, then 'Release' the target
4. Repeat process for all Targets, and
5. When completed, select 'Apply'.

Note: Calibration screen returns to Calibration tab if frst point is not touched within 10 seconds.
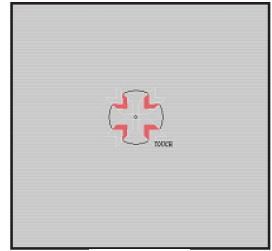

Figure 21

Calibration Verifcation *Drawing*
1. Select Tools tab
2. Select Drawing button
3. Using a fnger or stylus, draw or write (Figure 22)
4. Observe if screen displays drawing accurately. If it does not, repeat Custom Calibration Settings and Calibration Process instructions, and
5. When satisfed, select Quit button to exit; go to next step.

Figure 22

Edge Acceleration
1. Select Edge Acceleration tab (Figure 23)
2. Adjust the four edges of display screen to validate edge calibration; default is 0%; adjust up to 25% on each display edge
3. Use a fnger or stylus to verify touch accuracy on edges
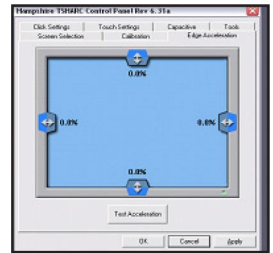4. If accurate, select Apply button.

Click Settings
Right Click
If desired for T/S application, check "Enable Right Click" box to set right click option (Figure 24).

Figure 23

Right Click Area
Use slide bar to set the T/S event area to a size slightly larger than the activator – larger for a fnger tip, smaller for a stylus; box displays the activator size.

Right Click Delay
The timed-hold right click mouse event allows User to initiate a right click by holding down a touch point for a specifc time period.
Use slide bar to set Right Click Delay value to time necessary to produce a right click event.

Figure 24

Double Click Area
This step sets the area that allows for a double click event. Limit this to areas that may be accurately touched several times.
Use slide bar to set double click area; box displays the activator size.

Double Click Speed
1. Use slide bar to set suffcient time to perform a double touch in specified area
2. Select Apply button to enter selection, and
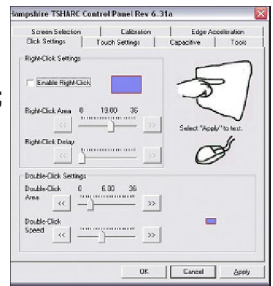3. Select OK button to apply all Click Settings.

Touch Settings
Normal
Emulates a standard mouse, allowing a single click, double click, drawing, dragging and right click option (if enabled) (Figure 25).

Touch Down
Allows for a click event to take place at touch down. No draw or drag is available.

Touch Up
Touch only. Double click is disabled. If right click was earlier enabled, it is now disabled.

Figure 25

Touch Sound
1. **Check Enable Touch Sound to enable a tonal beep when screen is touched**
2. **Select Apply button to enter selection, and**
3. **Select OK button to apply all Touch Settings.**

Capacitive Tab – Disabled
The T/S is a Resistive type; the Capacitive Tab is disabled.

Synchronized Touch Screen with Third-Party Display Rotation Drivers
The T/S may be set to automatically rotate when Display is rotated by third-party Display Rotation Drivers.

1. **Right click on System Tray icon, and**
2. **From TSHARC Rotation Control Panel Menu, enable (select) "Autodetect Rotation".**

Presetting Autodetect Rotation Parameters
To synchronize T/S with Display, map T/S rotation with all User-required Display rotations.

1. **Verify "Autodetect Rotation" is enabled**
2. **Rotate Display to all rotations needed using third-party Display Rotation program**
3. **Apply changes, and**
4. **Touch target displayed by TSHARC driver.**

Note: User should only need to synchronize Touch Screen with Display Rotation Drivers one time.

> **CAUTION!**
> - *Windows 98se, ME and 2000 supports only two orientations at any one time. User may rotate screen from Landscape to Portrait mode in either direction. User may not autodetect both Landscape and Portrait at same time - four orientations: 0°, 90°, 180° and 270°.*
> - *WinXP autodetects all four orientations: 0°, 90°, 180° and 270°*

> **WARNING!**
> *Warning! Touch Screen Display may be activated when cleaning. This may create a potentially dangerous condition: power down; disconnect cabling prior to cleaning. To disable: go to Tools tab > Select Screen Cleaning button > Touch Screen is disabled for 15 seconds to allow cleaning > Display reverts to default Touch after 15 seconds.*

APPENDIX A

Mechanical Drawings

Mount diagrams of DOD and dimensions may assist with installation of Display. These may be found on the ITECH website: http://www.itechlcd.com/installation.html

Optional Mounts

Diagrams of Flush, Panel or Rack Mounts and dimensions may assist with installation of Display. These may be found at: http://www.itechlcd.com/installation.html

APPENDIX B

Troubleshooting

Symptom: *No light behind button LEDs*

Possible Problem	Solution
No power, loose power connection	Confirm the Display is properly connected to a DC or AC power source. Verify the power source is live or try another battery or AC power outlet. Verify the Display is powered on.
Reverse polarity	Check polarity of the power connection.

Symptom: *Light behind button LEDs, no display or "No Signal" error message and/or no image on the Display*

Possible Problem	Solution
Power on, no video signal	Verify the video cable is plugged into the Computer Input video connector. Verify a video signal is coming out of the computer (i.e., plug into a known good display source). Verify the incoming signal source selected matches the Computer Monitor signal source. Check the Brightness front panel (LCD) adjustment on the Display. This may be set too low. Check the Brightness and Contrast controls in the OSD. These may be set too low. Computer may have gone into power management stand-by. Press any key on the keyboard, move the mouse or cursor, or if there is a Touch Screen, touch to wake the computer.

Symptom: *Display has rolling "bars" across the screen or vertical shaded bars on the image.*

Possible Problem	Solution
Computer video display is not set to view at 800 x 600 pixels or 1024 x 768 pixels	Verify computer video display is set at 800 x 600 pixels (1024 x 768 pixels).

Symptom: (continued) *Display has rolling "bars" across the screen or vertical shaded bars on the image.*

Possible Problem	Solution
Defective video cable	On a known good display source, confirm the video cable is not defective.
Interference from adjacent equipment	For proper grounding and shielding, verify use of a proper video cable. Keep the cable away from sources of EMI such as electric motors, or unshielded RFI sources such as radar and microwaves.
Horizontal size is not adjusted	In the OSD, adjust the horizontal size control.

Symptom: *Picture quality, image stability is distorted.*

Possible Problem	Solution
Not working in 800 x 600 pixel resolution or 1024 x 768 pixel resolution	Verify computer video display is set at 800 x 600 pixels (1024 x 768 pixels).
Proper cable grounding and shielding	Verify the use of a proper video cable with suitable grounding and shielding. Keep the video cable away from sources of EMI and RFI.
Improper video display settings	Check signal source for a proper signal. Verify computer video display is set at 800 x 600 pixels (1024 x 768 pixels). Verify the display refresh rate: 60 – 75Hz.
Display unit is farther than 3 m (10 ft) from signal source	Single cable lengths in excess of the standard 3 m (10 ft) cable should be of high quality shielded Computer Input cable. Contact ITECH for information on custom cables.
Multiple Monitors are driven from the same signal source.	Splitting the video signal divides the strength of the signal. A video signal booster (line driver) is recommended if installation requires more than one Display driven from a single video source.
Display has incorrect or bad sync signals.	Check for proper video cable installation, or replace suspected faulty cable. Verify computer video display is set at 800 x 600 pixels (1024 x 768 pixels) and at a 60 - 75Hz refresh rate.

Symptom: *Display image is not properly sized*

Possible Problem	Solution
OSD adjustments need to be made	Adjust the vertical and horizontal size controls through the OSD.
Improper video display settings	Verify computer video display is set at 800 x 600 pixels (1024 x 768 pixels) and at a 60 - 75Hz refresh rate.

Symptom: *Touch Screen (T/S) does not respond*

Possible Problem	Solution
T/S cable is not plugged in	Verify the connections between the T/S and the computer.
T/S cable is installed in a different COM port than installed by the software	Install the T/S into another COM port. If using a laptop, verify the COM port(s) is enabled.
T/S Controller driver has not been installed	Install the TSHARC Controller driver.
Hardware failure	Contact a ITECH Technical Support Technician (480.515.1110).

Symptom: *T/S moves, but does not follow a fnger or stylus*

Possible Problem	Solution
Controller is not calibrated	Run the calibration in the TSHARC Control Panel software.
T/S Controller Driver is not installed	Install the TSHARC Controller Driver.
T/S cable is not installed correctly	Verify the T/S cable is installed correctly.

Symptom: *"Error in Calibration" message appears*

Possible Problem	Solution
The T/S Controller Driver is not installed correctly	Uninstall the driver using "TSUN10.exe". If a previous T/S Controller Driver was installed, all footprints must be removed. Go to the T/S manufacturer's web site or contact the manufacturer for instructions to uninstall driver. Reinstall the TSHARC Driver software.

APPENDIX C

NEMA and IP Industry Standards

Two major electrical manufacturing organizations monitoring product enclosures and/or their degree of protection; each organization publishes technical manufacturing standards. The National Electrical Manufacturers Association (NEMA) Standard No. 250 – 2003 addresses non-hazardous locations, enclosure design and environmental performance requirements. These are referred to as NEMA Types. (www.nema.org)

The International Electrotechnical Commission (IEC) 60529 Standard addresses Ingress Protection (IP); this describes the degree of enclosure protection provided, not the enclosure itself. The frst digit of IP Code designation describes degree of protection against ingress of solids; second digit designates degree of protection against ingress of liquids. IP Codes support NEMA Type designations. (www.iec.ch)

iTech LCD designs the DOD sealed Display to exceed Standards of NEMA 6 and IP67, incorporating a range of environmentally-sealed connectors engineered to provide a safe and secure dust and waterproof environment in rugged conditions.

Summary of NEMA 6/IP 67: Enclosures constructed for indoor or outdoor use; to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against hose-directed water and the entry of water during occasional temporary submersion at a limited depth (6" to 3 feet or 15cm to 1m); and that will be undamaged by external formation of ice on the enclosure. Sealed from dust and water.